Exemption No. 5260

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of **DEHAVILLAND DIV., BOEING OF CANADA, LTD.** for an exemption from §§ 25.807(d), 25.1557(d), and 121.310(f)(6) of the Federal Aviation Regulations	**Regulatory Docket No. 023NM**

GRANT OF EXEMPTION

By letter 8-21-4-3 dated December 12, 1990, Mr. C. Watkiss Chief of Airworthiness, Boeing of Canada Ltd., de Havilland Division, petitioned for an exemption from §§ 25.807(d), 25.813(c)(1), 25.1557(d), and 121.310(f)(6) of the Federal Aviation Regulations (FAR) on behalf of de Havilland and Markair, an operator of DHC-8-311 airplanes, to permit type certification and operation of two airplanes which do not fully comply with the applicable standards for ditching exits.

The DHC-8-311 is a high-wing, twin-engine turboprop airplane with a mixed passenger/cargo capability. The airplane can also operate in an all-passenger or all-cargo mode.

Sections of the FAR affected:

Section 25.807(d) of the FAR requires that there be ditching exits installed in the airplane to enable occupants to evacuate the airplane in the event of landing on water. Ditching exits must be provided such that there is at least one exit on each side of the fuselage meeting the requirements of a Type III exit, and that there is at least one such exit for every 35 passengers. The regulations also allow the installation of one overhead hatch in lieu of each side exit, if the hatch is of Type III dimensions and is in the passenger compartment. If, due to the passenger capacity, only two side exits are required, one overhead hatch may be installed in lieu of those exits. These requirements apply whether or not ditching certification is requested. Section 25.813(c) specifies the minimum standards for access to Type III and Type IV passenger emergency exits. Although the petitioner requested an exemption from this section, an exemption is unnecessary

because § 25.813(c) does not apply to the overhead hatch. (Section 25.807(d) specifies only that the overhead hatch must have the minimum dimensions of a Type III exit.) Section 25.1557(d) requires that any door, through which passengers must pass to reach a required emergency exit, must be placarded to be open for takeoff and landing. Section 121.310(f)(6) similarly requires that any such door be fastened open for takeoff and landing.

Related sections of the FAR:

Section 25.807(c) specifies the minimum dimensions for Type III exits.

The petitioner's supportive information is as follows:

PETITION AND DISCUSSION

"de Havilland has contracted with a U.S. operator (Markair) to provide two DHC-8-311 aircraft (S/N 230 and S/N 242). These aircraft are to be equipped with a passenger compartment to cargo compartment bulkhead capable of being positioned at various locations along the fuselage. This moveable bulkhead permits operation of the aircraft with variable passenger/cargo capacities in the following combinations:

Bulkhead Location/Station	Passenger Capacity	Cargo Compartment Wetted Volume (cu ft)
197	0	1672
354	20	1143
515	40	600
576	48	390

"The cargo compartment at each of these locations is designed to the requirements of Class B. The number and type of exits on the DHC-8 Series 300 aircraft are as follows: Left-hand front - Airstair Door (30 X 65 inches) (i.e. larger than Type I); Right-hand front - Emergency Exit (24 X 54 inches) (i.e. larger than Type I); Left-hand rear - Emergency Exit (Standard Type III); Right-hand rear - Emergency Exit (Standard Type III); Front overhead hatch - Flight Compartment Emergency Exit (18.5 X 20.7 inches).

"With the bulkhead located at either Station 515 or 576, the number and type of exits available to the passengers satisfy the regulatory requirements. However, with the bulkhead at Station 354, the exit door arrangement does not satisfy the requirements of FAR 25.807(d)(2). This is because in a ditching scenario, the lower sill of one of the forward floor level exits will be below the water line. The DHC-8 is not unique in this regard, and similar aircraft (commuter size, high wing) suffer the same fate.

"The FAA's previous finding of Equivalent Safety on the ATR 42 to carry

up to 34 passengers, with only one of the two available floor level exits at the rear of the aircraft above the waterline, encouraged de Havilland to make a similar application. It was on this precedent that de Havilland, in good faith, entered into the contract with Markair knowing that the DHC-8 offered improved safety features over the ATR 42; i.e.,

- 20 passengers versus 34 passengers
- close passenger proximity from flight compartment hatch versus separation of passenger from flight compartment hatch by an extended cargo compartment.
- close proximity of flight attendant to flight compartment hatch (to aid evacuation)

"de Havilland submitted an application for Equivalent Safety by letter dated August 13, 1990. Following discussion with the FAA, the application was amended and re-submitted by letter dated September 25, 1990. At no time during this period did the FAA suggest that the application for Equivalent Safety was inappropriate.

"We understand that since that time the FAA have re-considered its finding of Equivalent Safety on the ATR 42 and is not prepared to make a similar finding on the DHC-8. de Havilland accepts the FAA's decision and understands that the favorable finding on the ATR 42 will be revoked.

U.S. PUBLIC INTEREST

"There remains the requirement on de Havilland's part, and the expectation on Markair's part to deliver two aircraft in December 1990. de Havilland commits to making changes to the aircraft that will ensure compliance with FAR 25.807(d)(2), (and consequently demonstrate compliance with 25.813(c)(1), 25.1557(d) and 121.310(f)(6)) but the changes will take time to design, manufacture and certify. We do not believe it is in the interest of the Alaskan public to deny the essential service these aircraft would provide if allowed to enter service for a limited period until the changes can be made.

"The Markair route structure is constructed to serve the needs of the rural Alaska population which is scattered over five hundred and eighty-six thousand square miles. These areas have communities with populations varying from a few thousand to less than one hundred.

"This market area can only be served by a cost efficient aircraft that has the capability to operate from both paved and gravel runways and also has the capability to serve both cargo and passengers on all flight segments. The basic reason for the cargo/passenger (Combi) is due to the great variations in cargo/passenger mix on a daily basis between the different seasons of the year along with the sparse permanent population and the vast distances within the State.

"Spring, summer, fall and winter present radically different passenger counts. Passenger volumes tend to increase over 100 percent in the three short summer months. It is easy to recognize that in the state of Alaska with no road system, air travel is a necessary part of life and not a luxury or alternate means of transportation. One can also readily determine that a high degree of flexibility is essential to accommodate the radical swings in volume of both cargo and passengers.

"Alaska's bush population is comprised primarily of minority people, namely Indian, Eskimo, as well as Alaskan Natives. These minority people depend on the flexibility of a Combi aircraft, especially in the 20 passenger/1143 cu ft configuration as a primary means of transportation for travel, emergency travel, mail and freight. In Alaska, the bush depends on building materials and household goods, as well as essential commodities such as basic food stuffs (milk, etc.) and medication/drugs all travelling under the guise of mail. These items are the very sustenance of life for people in the Alaskan bush. The flexibility of a Combi aircraft, especially in the 20 passenger/1143 cu ft configuration is the only viable means of transportation when you couple personal and emergency travel with the mail and freight."

"The availability of DHC-8 S/N 230 and 242 is already delayed from the original schedule for introduction into service. This is placing an increasing burden on existing equipment usage at Markair. Markair's fleet can not provide the anticipated demand for cargo and passenger lift from now until June 30, 1991, without these two aircraft.

PROPOSAL FOR COMPLIANCE

"The basic characteristics of the DHC-8 and the additional features on Markair's aircraft to a large extent compensate for the lack of two side exits per 25.807(d) and minimize the hazard during a possible inadvertent ditching. Namely:

1. There is an overhead emergency escape hatch situated in the flight compartment in close proximity to the passengers and flight attendant.

2. When the flight compartment door is open, this hatch is readily accessible to the passengers in compliance with FAR 25.813(c).

3. To assist the passengers in using the overhead hatch, there is a step (to facilitate access onto the observer's seat), hand hold and explanatory placards.

4. Access and operating instructions will also be available on a passenger briefing card.

5. Unimpeded access to the hatch is provided when the flight compartment door is opened and latched in compliance with FAR 25.1557(d).

"The only impediment to the unobstructed use of the overhead hatch by the passengers is when the observer's seat is occupied by a FAA Aviation Safety Inspector or a duly authorized Check Airman. Under these circumstances the flight compartment door must be closed in contravention of FAR 121.310(f)(6). However, during an emergency, the flight crew would normally be involved in the evacuation of the occupants and would open the flight compartment door (and overhead hatch if required). Should the door become jammed due to structural damage, then it can be removed by releasing the door hinge pins from within the flight compartment per FAR 25.772(a)."

"We believe the design features of the DHC-8-311 aircraft compensate for the unavailability of one of the forward floor level exits, as required for inadvertent ditching, when the aircraft is configured for 20 passengers. Furthermore, the operator's route structure does not comprise any extended over water operations. Given the extended and severe winter operations until changes to the aircraft can be incorporated, the bodies of water likely to be encountered will be iced over for most of the time.

"It is extremely unlikely that a ditching scenario will occur. It is less likely that a ditching will occur within the next six/seven months in Alaska while the aircraft is operated in the 20 passenger configuration. It is more remote still, that this scenario would cause useable high side Type I exit to be unavailable and thus necessitate evacuation through the overhead hatch.

SUMMARY

"We believe the preceding argument provides ample justification for granting this petition for exemption to the requirements of FAR 25.807(d)(2) and 121.310(f)(6). We also believe there is sufficient justification for not offering this petition for public comment. The negotiations between de Havilland, FAA, Transport Canada and Markair to gain certification of these aircraft has been complex and protracted. A principle cause of this has been the need to certify a Combi configuration at a time when the FAA, while developing new requirements for Class B compartments, has not yet completed this rule making.

"Consequently, the late notification of the FAA's requirement for this petition has consumed the time normally allowed for public comment. To further delay the certification and delivery of these aircraft would unjustly penalize the inhabitants of the state of Alaska. Considering the maximum number of aircraft is only two, and the period for which the exemption would apply is to June 30, 1991. We believe there is sufficient grounds to waive the normal public comment procedure."

The FAA finds for good cause that action on this petition should not be delayed by public comment for the following reasons. The FAA was first made aware of de Havilland's intent to request an equivalent level of safety

finding for the ditching exits regulation in mid-August. The details of the request were not known to the FAA at that time. As noted in the petitioner's supporting data, there was a precedent in this regard which de Havilland presumed would be applicable to their airplane. The FAA became aware of the details of the proposal in early October and advised de Havilland at that time that their proposal did not comply with the regulations and did not represent an equivalent level of safety, in accordance with § 21.21(b)(1). At approximately that time, it was agreed that there might be a means to approve the airplane with certain operational and design limitations for a limited time, while suitable design modifications were made to the airplane to achieve literal compliance. The mechanism of this interim approval was not firmly established, and the FAA later determined that an exemption would be required. De Havilland was advised of this determination in late November. Consequently, by the time the need for an exemption was documented there was insufficient time to publish the petition without delaying the delivery and operation of airplanes. Therefore, the petitioner acted in a timely manner in filing this petition. Further, since the airplane is scheduled to be delivered on December 27, 1990, and placed into service shortly thereafter, the delay that would result from publication would be detrimental to the petitioner.

The FAA's analysis/summary is as follows:

The FAA has carefully considered the information provided by the petitioner and has determined that there is sufficient merit to warrant a grant of exemption. Since the regulations do allow the use of an overhead hatch, the considerations which are relevant here are the size and the location of the hatch on the DHC-8. Since the hatch is smaller than the size required and is located in the flight deck, it cannot be reasonably said to be equivalent to the exit required by the regulations. However, taken in total, there are other factors which make the granting of the exemption in the public interest. The particular version of the airplane in question is only one of four possible configurations which could be installed. In this configuration, there are only 20 passengers, or 59 percent of the number that have been allowed on airplanes with a similar (land) exit arrangement. Should there be an inadvertent water landing, the number of passengers that might have to use the overhead hatch is then relatively small. In addition, the need to use the overhead hatch is only manifest if the floor level exit on the high side (with respect to flotation attitude) is unavailable. The petitioner has conducted demonstrations to show the efficacy of the overhead hatch for a wide cross-section of occupants. These demonstrations show that 20 passengers can utilize the overhead hatch, without crew assistance, in a time commensurate with the flotation capability of the airplane. The demonstrations were conducted under emergency lighting conditions following a normal preflight briefing and passengers were required to evacuate unaided by crew. The petitioner has modified the access provisions for the hatch to accommodate untrained passengers by providing steps and handholds in addition to provisions that are normally made for the flightcrew.

As noted in the petitioners supportive information, the operator of the airplane fulfills a special aviation support need for certain Alaskan communities whose sole sources of food and supplies are via air commerce. Because demand for passenger seats is less in the winter, and the dependence of those communities on cargo carriage is greater, the need for the 20 passenger configuration is particularly acute at this time of year.

The FAA has considered the likelihood of an inadvertent water landing, coupled with the unavailability of the high-side floor level exit, as part of the decision on this petition. Inadvertent water landing is an assumed condition for compliance with Part 25 of the FAR. The assumption is based on the lifetime of the airplane and a "fleet" of such airplanes in service. The FAA has determined that the use of the overhead hatch, while feasible, is not an acceptable ditching exit for the long term, and for all airplanes. Nevertheless, the FAA considers this concern to be outweighed by need to serve certain communities provided that certain criteria are met.

The flight deck overhead hatch will be a required passenger exit for a period of approximately six months and, as such, should have unobstructed access from the passenger cabin. This will entail latching the cockpit door open for takeoff and landing. The cockpit door also serves as the attachment for the seat back of the observer's seat that is required by the regulations. Since occupancy of the observer's seat is a necessary safety function for FAA inspectors or duly authorized check airmen, the seat will need to be available at certain times. The FAA considers that during these times the cockpit door may be closed (but not locked) for takeoff and landing, provided the occupant of the seat is instructed to open the cockpit door in the event of an inadvertent water landing. This provision requires exemption from § 121.310(f)(6) which requires that any door through which a passenger must pass to reach a required exit be latched open for takeoff and landing. Similarly, § 25.1557(d) requires that such doors be placarded to be open for takeoff and landing. The FAA considers that the installation of a placard which requires the door to be open for takeoff and landing may be confusing during those times when the door is permitted to be closed. Therefore, the intent of the requirement will be satisfied by a note in the airplane flight manual stating when the door must be open.

As noted above, the requested exemption from the provisions of § 25.813(c)(1) is unnecessary because that section is not relevant to the overhead hatch.

In consideration of the foregoing, I find that a grant of exemption is in the public interest, and will allow operation of the DHC-8-311 combi airplanes for a limited period without an adverse impact on safety. Therefore, pursuant to the authority contained in §§ 313(a) and 601(c) of the Federal Aviation Act of 1958, delegated to me by the Administrator (14 CFR 11.53), the petition of

de Havilland Corporation to exempt them from compliance with §§ 25.807(d), 25.1557(d), and to exempt Markair, Inc. from compliance with § 121.310(f)(6) of the FAR is granted, with the following provisions:

1. This exemption is limited to two de Havilland Model DHC-8-311 airplanes, serial numbers 230 and 242, while operated by Markair, Inc. in the state of Alaska.

2. The cockpit door must be fastened open during takeoff and landing, except when the observer's seat is occupied by an FAA aviation safety inspector, or a duly authorized check airmen acting on behalf of the Administrator.

3. This exemption expires on June 30, 1991.

Issued in Renton, Washington on

Bill R. Boxwell
Acting Manager,
Transport Airplane Directorate
Aircraft Certification Service

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Revised and moved to exemption directory 12/24/90
Revised 12/26/90 JET (per GK changes)

Moved to F:\HOME\JET\RULES\DHC-8.EXM on 12-27-90